View metadata, citation and similar papers at core.ac.uk
brought to you by CORE
provided by Elsevier - Publisher Connector

proliferative and differentiative conditions and that this biogenic amine also affects cell fate *in vitro*.

Supported by DGAPA (IN226703), UNAM.

doi:10.1016/j.ydbio.2007.03.577

Program/Abstract # 278
Embryonic stem cell-derived precursors but not neurosphere cells efficiently differentiate to dopaminergic neurons in the embryonic midbrain

Jose Manuel Baizabal Carballo, Luis F. Covarrubias Robles
Dept. of Developmental Genetics and Molecular Physiology, Instituto de Biotecnología/UNAM, Mexico

Neural Precursor Cells (NPCs) have proven to be a source of the dopaminergic neurons population affected during Parkinson's disease. However, dopaminergic neuron differentiation in vitro is relatively low and the identification of NPCs with high plasticity to generate dopaminergic neurons remain to be done. Here, we demonstrate that NPCs isolated from the embryonic midbrain produced many mature neurons and site-specifically differentiated to dopaminergic neurons after reintegration into the ventral midbrain. However, midbrain NPCs expanded in vitro as neurospheres produced few neurons in the midbrain and did not differentiate to dopaminergic neurons. By contrast, NPCs derived from Embryonic Stem Cells (ESCs) strongly differentiated to mature neurons in the embryonic midbrain. Surprisingly, neuralization was not required for abundant neuronal differentiation of ESCs-derived precursors after integration into the embryonic midbrain. More importantly, neurogenic ESCs-derived precursors generated many dopaminergic neurons exclusively when located at the site of endogenous dopaminergic neuron differentiation in the midbrain. These data indicate that neurosphere culture causes dramatic changes in the differentiation potential of neurogenic NPCs, while ESCs-derived precursors efficiently respond to midbrain neurogenic signals and differentiate to dopaminergic neurons.

Supported by IMPULSA/UNAM, DGAPA/UNAM and Conacyt.

doi:10.1016/j.ydbio.2007.03.578

Program/Abstract # 279
Regulation of progesterone and estrogen α receptors expression during differentiation of mouse embryonic stem cells to dopamine neurons

Nestor Díaz [1], Nestor E. Diaz-Martinez [2], Christian Guerra-Araiza [1], Ignacio Camacho-Arroyo [1], Ivan Velasco [2]
[1] *Dept. Biologia., UNAM, Mexico D.F., Mexico*
[2] *Dept. Neurociencias, UNAM, Mexico D.F., Mexico*

Embryonic stem cells (ESC) possess the ability to differentiate into nerve cells, including dopamine (DA) neurons, which upon transplantation revert the motor signs of Parkinsonian animals. Ovarian steroid hormones estradiol and progesterone (P), play important roles in development and reproduction in mammals. Parkinson's disease is more frequent in men than in women. This suggests that sexual hormones could play a role in DA neuron survival and differentiation. We investigated the expression pattern of P and estrogen (E) receptors at the protein level during the 5-stage protocol of DA neuronal differentiation of mouse ESC, by Western blot and immunocytochemistry. The expression of the transcription factor Oct-4 indicated that ESC were in a pluripotent state in stage 1. The neural stem cell marker nestin was expressed on stage 4, and neurons positive for tyrosine hydroxylase (TH) were detected at the end of the procedure. P receptor isoforms A and B content augmented in stage 5 relative to stage 1, and E receptor a suffered a reduction when neural precursors and DA neurons were present. In addition, we found that 92% of DA neurons expressed PR and only 19% of these neurons co-expressed TH and E receptor a. We also found that 100 nM estradiol increased the number of TH+ cells. These results show that estradiol influence DA differentiation of ESC.

doi:10.1016/j.ydbio.2007.03.579

Program/Abstract # 280
Differentiation of aldynoglia from multipotential neural precursors. Microarrays analysis

Argelia E. Rojas Mayorquín, Nadia M. Torres Ruíz, Graciela Gudiño Cabrera, Daniel Ortuño Sahagún
Dev. and Neural Regeneration Lab. Inst. of Neurobiology, DBCyM, CUCBA, University of Guadalajara, Mexico

CNS in mammals exhibits well defined regions in which axonal reparation arise spontaneously. In those areas, a particular glial phenotype, the aldynoglia, promotes neuronal growth and regeneration. The prototype of this central glia is the ensheating cells from the olfactory bulb. Since factors that regulate the production of new cells from multipotential neural precursors (MNP) have only recently started to be recognized, we are interested in the differentiation mechanisms of the aldynoglia phenotype from the MNP. In this work we induced *in vitro* the differentiation of embryonic MNP towards the aldynoglia phenotype. For the analysis of the genetic expression, we hybridized microarrays between undifferentiated MNP and MNP that were differentiated in vitro for 24 h. Less than 2% of the 5,000 analyzed genes modified its mRNA expression in a significant level (>2.5 times) after the differentiation was accomplished. We analyzed 84 genes in detail. In differentiated MNP cells 61 genes increased their expression, 65% are genes related directly to cellular differentiation processes, principally ARF3, cytokeratin18, EGAP, nucleophosmin1, prolactin receptor, HNF4a, BMPrIa, Mash1 and TNF2. Only 23 genes diminished their expression with the differentiation, mainly cell cycle regulatory proteins as cyclin D1, and others related with the leave of the undifferentiated phenotype, mainly fancc, POU3f3 and Sam68. The results of these analyses are a starting point to the study of the genes involved in the induction of the differentiation of aldynoglia from MNP.

doi:10.1016/j.ydbio.2007.03.580